

**Logistics Planning Outline for the 2010/2011 NBP/ODEN 2-boat Operation**

***In an attempt to coordinate the science between the ODEN and the NBP for next year's 2-boat operation, the information below will be compiled and passed out during the planning meeting in November.***

<b>Principal Investigator:</b> Arrigo, Kevin
<b>Project leader onboard NBP/ODEN (if other than P.I.):</b> Arrigo, Kevin
<b>Project title:</b> <b>Oden science: Sea ice ecology in the Amundsen and Eastern Ross Sea</b>
<b>Participants onboard (tentative):</b> Total: 4 persons Name and function: Kevin Arrigo, Project Leader, Field and Lab work Phillipe Totell, Trace gas analysis and 14C experimental work Ben Saenz, Sample collection and processing Matt Mills, Sample collection and processing

Please give a brief cruise synopsis. Include the following: research objectives and proposed cruise track.

The primary objective of this proposal will be to extensively sample the microbial community throughout the large expanse of sea ice that is located between the Bellingshausen Sea and the Ross Sea, Antarctica. During this transit, we will 1) characterize the spatial variability in the sea ice microbial community composition, 2) measure the biomass, photophysiology and metabolic rates of the ice algal community, 3) use underway sampling to make continuous measurements of climatically important gases such as CO<sub>2</sub> and DMS to identify and discretely sample "hot spots" within the pack ice, 4) utilize molecular tools to determine phytoplankton responsible for CO<sub>2</sub> uptake and DMSP production and to what extent physical and chemical factors control these processes. Ideally, we would sample along an-east-west transect between the Antarctic Peninsula and the Ross Sea, and along one or more north-south transects, one of which should be associated with the Amundsen Sea polynya.

Briefly describe sampling methods and major systems and equipment (collection method (i.e standard CTD, plankton nets, MOCness Nets, etc...))

The underway membrane inlet mass spectrometer (MIMS) will sample surface seawater (~5 m depth) from the ship's scientific supply line.

For physiological experiments we will also require ~ 20 L samples from Nisking bottles (5 – 20 m depth)

Ice stations every 0.5-1.0 °

Standard CTD adjacent to ice stations, collecting water from < 300m depth

Sampling methods and sites when ship in motion

Site/area/transect	Type of sampling to be performed, volume of H <sub>2</sub> O collected
MIMS underway analysis for full cruise track	

Sampling methods and sites from stationary ship

Sampling site	Type of sampling, weight/volume of samples and equipment, etc.	Time per station
Various hydrographic stations	~ Sampling w/ Niskin bottles (shallow profile <300m, and 1 depth 50-20m where 10L collected)	~30-60 min

Sampling method and sites away from the ship, on ice

Sampling site	No. of persons	Type of sampling, weight/volume of samples and equipment, etc.	Time per station
Collection of sea ice cores/samples	Up to 4	Several cores per site (~3) will be collected/ coring equipment needed	~2hrs

Deployment/retrieval of equipment

Site	Type of equipment, weight/ volume, procedure, etc.	Time per station

Which are the most prioritized sampling areas/methods?

Site/area	Method/type of sample	Other info
Ice stations	Coring- collection of phytoplankton layer in ice and core physical measurements (temp, etc...)	
Underway measurements	Directly from underway system	
Hydrographic station adjacent to ice station	Water collection using niskins	

The following equipment needs to be installed onboard  
(describe in detail, also needed connections to electricity, water, gas etc):

Quadropole mass spectrometer. Needs high quality 120 V, 60 Hz power (i.e. UPS back up with minimal line fluctuations). Also needs a GPS feed via serial port connection (rs-232). Total bench foot print is about 4 feet by 2 feet. Needs to have good access to a flowing seawater supply in a laboratory close to gas tank storage.
We will need to set up a photosynthetron in a RAD Container (120 V). Foot print is ~2ft by 4 ft.
PAM Fluorometer and/or FRRF
Turner Fluorometer 10-AU
UV/Vis Spectrophotometer (scanning)

Lab space	Wet lab	Dry lab	Other / specify
Meters of bench space	2m <sup>2</sup>	4-5 m <sup>2</sup>	Cold room space (1-2m <sup>2</sup> )
Power needs (VA) 220/380 V			120V
Cold water (yes/no)		y	
Hot water (yes/no)		y	
Sewage (yes/no)	y	y	
Compressed air (yes/no)		y	
Gas (yes/no)		y	
Fume hood (yes/no)		y	
Sea water intake (yes/no)		y	
Other (specify)			

Special lab areas needed:

Clean air room	
Other (specify)	14C container

Storage of equipment and samples:

	Space needed (m <sup>2</sup> /m <sup>3</sup> )
Container	
Cold +2°C	~1m <sup>3</sup>
Freezer -20°C	~0.5m <sup>3</sup>
Other (specify)	-80 freezer space (~0.5m <sup>3</sup> )

The following chemicals, gases or other hazardous substances will be used, including radioisotopes or other substances which may constitute a threat of contamination for sensitive analyses:

Substance	Weight/vol.	To be used for:
$^{14}\text{C-HCO}_3^-$ (Total Activity ~50 mCi)	~25 ml	Primary productivity / C uptake experiments
Gluteraldehyde 50%	250ml	Cell preservation
Methanol	2.5L	Pigment Absorb. Spec.
Acetone	10L	Chl a measurement

Hazardous waste:

Substance	Weight/vol.	Comments
$^{14}\text{C}$ -labeled seawater	70L	
Gluteraldehyde	10L, 2%	In Seawater
Methanol ~90%	10L	In Seawater
Acetone ~90%	20L	In Seawater

Disturbance to or sampling of organisms:

1. Species (scientific and English name)	
2. Handling/sampling method	
3. Storage or handling onboard	
4. Possible risks to health or environment	
5. Consideration required from the ship/other researchers	

Cargo to be taken onboard the ship:

Type, handling/storage	Weight (kg)	Volume (m3)
About 14 wooden / plastic crates of equipment	500	~12

Cargo and samples to be taken off the ship:

Type, handling/storage	Weight (kg)	Volume (m3)
About 10 wooden / plastic crates of equipment	~ 400	~ 12
Frozen samples (-80 °C) 4 boxes	?	?
Frozen Samples in Liquid N2 dry shipper		

Other support needed onboard Oden, or in preparation phase:

We need a container for 14C work onboard.  
 We need space in a cold room for sample processing  
 We request a Raytheon Nutrient Technician onboard